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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,980	03/02/2004	Masami Seto	R2180.0191/P191	9655
24998	7590	06/15/2005	EXAMINER	
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP			HO, TU TU V	
2101 L Street, NW			ART UNIT	
Washington, DC 20037			PAPER NUMBER	
			2818	
DATE MAILED: 06/15/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

10/789,980

Applicant(s)

SETO ET AL.

Examiner

Tu-Tu Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2004 and 01 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 9-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>03/02/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Oath/Declaration

1. The oath/declaration filed on 06/02/2004 is acceptable.

Election/ Restriction

2. Applicant's election with traverse of Invention IA, claims 1-8, in the reply filed on 06/01/2005 is acknowledged. The traversal is on the ground(s) that search and examination of the entire application can be made without serious burden. This is not found persuasive because the different inventions, as detailed in the Restriction Requirement mailed 05/06/2005, are in different classifications. Thus, a search and examination of the entire application will pose a serious burden on the examiner.

The requirement is still deemed proper and is therefore made FINAL.

3. Claims 9-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 06/01/2005, as noted above.

Claim Objections

4. Claim 2 is objected to because of the following informalities: Claim 2 recites: "wherein the insulating film remains between the fuse element and the trimming opening until a process of

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cutting the fuse element is performed”. However, the limitation “until a process of cutting the fuse element is performed” is taken to be a product-by-process limitation and is considered a non-limitation in a device claim. Furthermore, as detailed below, the claim gives rise to an uncertain product. Appropriate correction is required.

5. Claim 6 is objected to because of the following informalities: Claim 6 recites: “the contour of the semiconductor device” which lacks an antecedent basis. Amend claim 6 so that it depends on claim 4 or 5. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter that the applicant regards as his invention.

6. **Claim 2** is rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites: “wherein the insulating film remains between the fuse element and the trimming opening until a process of cutting the fuse element is performed”. However, it is not certain that the insulating film remains, and how much of the insulating film remains, between the fuse element and the trimming opening as a final product, i.e., after the process of cutting the fuse element is performed. Since there are multiple scenarios, the claim does not particularly point out and distinctly claim the subject matter.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

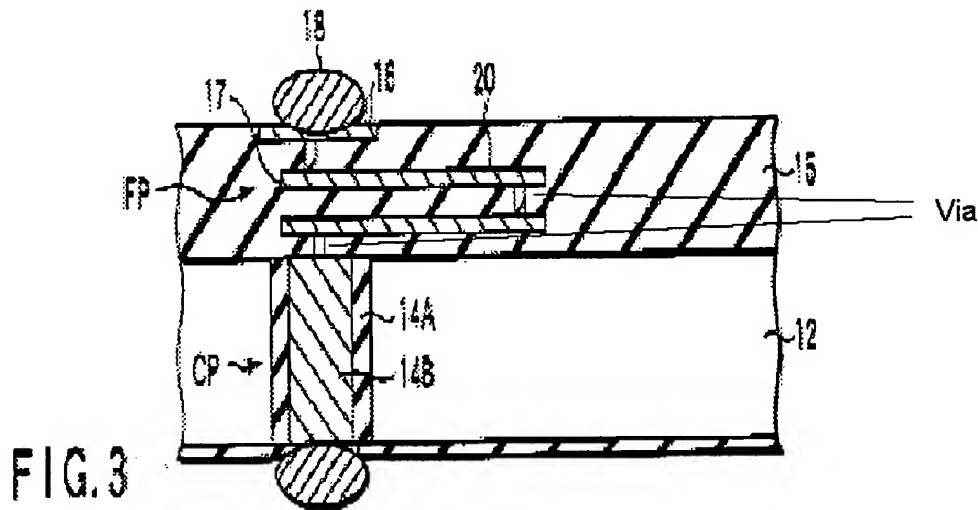
7. **Claims 1 and 3** are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sasaki et al. U.S. Patent Application Publication 20010045645 (the '645 reference).

The '645 reference discloses in Figure 3 and respective portions of the specification a semiconductor device as claimed or substantially as claimed. In particular, the reference discloses a semiconductor device, comprising: a semiconductor substrate (12, paragraph [0038]: "semiconductor substrate 12") including main and back surfaces and a trimming opening (generally defined by CP or 14A/14B) penetrating therethrough from the back surface to the main surface; an insulating film (15) formed on the semiconductor substrate; and a fuse element (20, paragraph [0039]) formed in the insulating film at a position facing the trimming opening.

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The reference further discloses wirings 17 and conductive vias in electrical communication with the fuse element 20.

In other words, the figure fails to clearly depict that the fuse element formed on the main surface of the semiconductor substrate through the insulating film as claimed in **claim 1**.

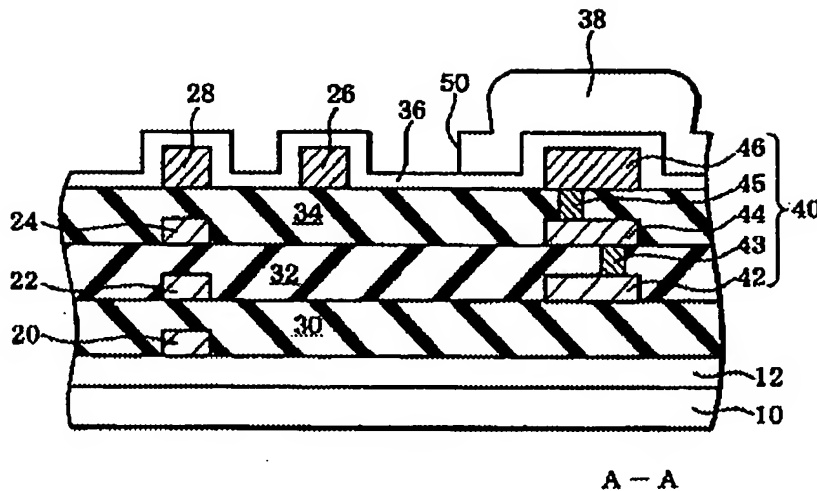


Note: "Via" is added by the examiner for ease of explanation

However, at the time the invention was made, it was known that conductive vias and wirings ("metalization lines") for semiconductor devices are formed by a process and structure more complicated than as depicted in Fig. 3.

In particular and as an example, at the time the invention was made, a semiconductor device having a fuse (26), metal lines (20,22,24,42,44) and vias (43,45) is disclosed by Watanabe U.S. Patent Application Publication 20030085445.

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Specifically, Watanabe discloses that the fuse element (26) is formed on the main surface of the semiconductor substrate through the insulating film (30/32/34), and that metal lines of different levels and vias of different levels are formed from different insulating layers (30, 32, 34).

In other words, at the time the invention was made, the fuse element 20 of the '645 reference simply could not be made in the insulating layer 15 as shown. To be specific, the lower level via and the lower level metal line of the '645 reference must be made in a separate insulating layer, similar to insulating layer 30, 32, or 34 of the Watanabe reference, and that the fuse element 20 must be made on that insulating layer, or in other words, the fuse is formed on the main surface of the semiconductor substrate through that insulating film, and yet in other words, the fuse is formed on the main surface of the semiconductor substrate through the insulating film as claimed. Thus the reference anticipates the claim.

Nevertheless, if one in the art subscribes to the argument that everything in a reference must be spelled out exactly word by word, element by element, to anticipate the claim, then obviously the '645 can not anticipate the claim.

However, in the alternative, as detailed above, the insulating layer 15 of the '645 reference should comprise different layers of insulating layers, because that was how one of ordinary skill in that art at the time the invention was made would do, thus would be obvious, to form a semiconductor device having a fuse element, a metal line, and a conductive via.

Referring to **claim 3**, the '645 reference further discloses that the trimming opening (generally defined by CP or 14A/14B) is sealed (by 14A/14B). However, the reference fails to disclose that the trimming is sealed from the back surface of the semiconductor substrate as claimed. In other words, the reference fails to disclose that the trimming is sealed from the back surface of the semiconductor substrate or from the front surface of the semiconductor substrate. However, the limitation "from the back surface of the semiconductor substrate" or the limitation "from the front surface of the semiconductor substrate" each results in the same seal and/or the limitations are considered to be a "product-by-process" limitation, therefore are considered non-limitation and/or are obvious because the final product is the same.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 4-5** are rejected under 35 U.S.C. §103(a) as being unpatentable over Sasaki et al. U.S. Patent Application Publication 20010045645 (the '645 reference) as applied above and further in view of Wang et al. U.S. Patent 6,638,863.

The '645 reference discloses a semiconductor device substantially as claimed and as detailed above but fails to teach that the semiconductor device has a contour with a plurality of corner edges which are rounded, and thus further fails to disclose that one of the plurality of corner edges has a curvature greater than those of others of the plurality of corner edges.

Wang, in also disclosing a semiconductor device, teaches that the rounded corners of the semiconductor device (Fig. 10) reduces stress for the semiconductor device (column 10, lines 6-14).

Therefore, it would have been obvious to one of ordinary skill in the art the time the invention was made to form the semiconductor device of the '645 reference such that the semiconductor device has a contour with a plurality of corner edges which are rounded. One would have been motivated to make such a change because rounded corners reduce stress for the semiconductor device.

Referring to **claim 5**, it would be within the ability of a person of ordinary skill in the art, therefore would have been obvious, to form the corner edges such that one of which has a curvature greater than those of others of the plurality of corner edges.

9. **Claims 7-8** are rejected under 35 U.S.C. §103(a) as being unpatentable over Sasaki et al. U.S. Patent Application Publication 20010045645 (the '645 reference) as applied above and further in view of Ondricek et al. U.S. Patent Application Publication 20020025603.

The '645 reference discloses a semiconductor device substantially as claimed and as detailed above but fails to teach that the semiconductor device has a marking thereon, thus further fails to teach that the missing marking is formed on the back surface of the semiconductor substrate, and thus further fails to teach that the missing marking is formed by laser irradiation.

Ondricek, in also disclosing a semiconductor device (a "semiconductor die"), teaches that the semiconductor device could comprise a marking, a bar code, or an identification number to help retain useful information for the semiconductor device (paragraph [0086]).

Therefore, it would have been obvious to one of ordinary skill in the art the time the invention was made to form the semiconductor device of the '645 reference such that it comprises a marking thereon. One would have been motivated to make such a change because the marking helps retain useful information for the semiconductor device.

Referring to the limitation that the marking is formed on the back surface of the semiconductor substrate, it is within the ability of a person of ordinary skill in the art, therefore would have been obvious, to choose where to form the marking.

Referring to the limitation "laser irradiation" in the limitation that the marking is formed by laser irradiation, the limitation "laser irradiation" is taken to be a product-by-process limitation and is considered a non-limitation.

10. **Claim 6** is rejected under 35 U.S.C. §103(a) as being unpatentable over Sasaki et al. U.S. Patent Application Publication 20010045645 (the '645 reference) in view of Wang et al. U.S. Patent 6,638,863 as applied above and further in view of Ondricek et al. U.S. Patent Application Publication 20020025603.

The '645 reference and Wang discloses a semiconductor device substantially as claimed and as detailed above but fails to teach that the side surface of the contour of the semiconductor device has a bar code thereon, thus further fails to teach that the missing bar code is formed of pits and dents.

Ondricek, in also disclosing a semiconductor device (a "semiconductor die"), teaches that the semiconductor device could comprise a marking, a bar code, or an identification number to help retain useful information for the semiconductor device (paragraph [0086]).

Therefore, it would have been obvious to one of ordinary skill in the art the time the invention was made to form the semiconductor device of the '645 reference such that it comprises a bar code thereon. One would have been motivated to make such a change because the bar code helps retain useful information for the semiconductor device.

Referring to the limitation the side surface of the contour of the semiconductor device in the limitation that the bar code is formed in the side surface of the contour of the semiconductor device, it is within the ability of a person of ordinary skill in the art, therefore would have been obvious, to choose where to form the bar code in the semiconductor device.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu-Tu Ho whose telephone number is (571) 272-1778. The examiner can normally be reached on 6:30 am - 5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID NELMS can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tu-Tu Ho
June 11, 2005